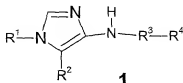


# **IMIDAZOLE DERIVATIVES**

## **Abstract**

The invention provides compounds of formula 1



- 5 wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> are as defined, and their pharmaceutically acceptable salts. Compounds of formula 1 are indicated to have activity inhibiting cdk5, cdk2, and GSK-3. Pharmaceutical compositions and methods comprising compounds of formula 1 for treating and preventing diseases and conditions comprising abnormal cell growth, such as cancer, and neurodegenerative diseases and conditions and those affected by dopamine
- 10 neurotransmission. Also described are pharmaceutical compositions and methods comprising compounds of formula 1 for treating male fertility and sperm motility; diabetes mellitus; impaired glucose tolerance; metabolic syndrome or syndrome X; polycystic ovary syndrome; adipogenesis and obesity; myogenesis and frailty, for example age-related decline in physical performance; acute sarcopenia, for example muscle atrophy and/or cachexia associated with burns, bed rest, limb immobilization, or major thoracic, abdominal, and/or
- 15 orthopedic surgery; sepsis; hair loss, hair thinning, and balding; and immunodeficiency.